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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,884	08/25/2003	Hsiang-Lan Lung	9761-US-PA	1883

31561 7590 04/26/2004

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER

PHAM, THANH V

ART UNIT PAPER NUMBER

2823

DATE MAILED: 04/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,884	LUNG ET AL.	
	Examiner	Art Unit	
	Thanh V Pham	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>08/25/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of group II, claims 10-24, in Paper dated 03/10/04 is acknowledged.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 10-15 and 18-24 are rejected under 35 U.S.C. 102(a) as being anticipated by Batra et al. US 2003/0235064 A1.

Re claim 10, the Batra et al. reference discloses a method for fabricating a non-volatile memory cell, figs. 3-7, comprising: providing a substrate 21; sequentially forming a first insulating layer 22, a metal oxide layer 23 and a second insulating layer 24 on the substrate; performing an annealing to convert the metal oxide layer to a plurality of metal nano-particles with thermal dissociation [0021], while the first insulating layer, the

Art Unit: 2823

second insulating layer and the metal nano-particles together constitute a charge-trapping layer [0022]; forming a gate 25 on the charge-trapping layer; and forming a source/drain 26/27 in the substrate beside the gate.

Re claim 11, the Batra et al. reference's claim 40 discloses the method further comprising forming several metal oxide layers and insulating layers on the second insulating layer so that multi layers of metal nano-particles are formed with the annealing.

Re claims 12-15 and 23, the Batra et al. reference discloses the annealing is conducted under vacuum from 200-800 °C, the noble metal oxide layer is formed by CVD, ALD or PVD [0021], platinum is preferred over ruthenium in forming the oxide for the metal oxide layer, [0008].

Re claims 18-19, the Batra et al. reference discloses the size of the metal nano-particles are less than about 5 nm in between a tunnel oxide of 1.5 nm or less and control oxide of 7 nm or less, [0003].

Re claims 20-22 and 24, the Batra et al. reference discloses the first and second insulating layers comprise different or the same material of Al₂O₃, HfO₂ or ZrO₂ or both comprise silicon oxide, [0008], [0022], or claims 15-19.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2823

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Batra et al. as applied to claims 10-15, 18-24 above, and further in view of Wolf, Vol. 1, pages 340-359.

The Batra et al. reference discloses all of the limitations of the instant invention but lacks the oxygen flow rate of 15 sccm, the sputtering pressure of 20 mTorr and a sputtering rate of 2 nm/min in the reactive sputtering process and the time length of the annealing. However, choice of temperature, partial pressures of the gas and the time length of annealing would have been a matter of routine optimization as recognized by Wolf (page 314, e.g.) in the process of sputtering, because temperature, pressure and timing are known to affect device properties and would depend on the desired device characteristics. One of ordinary skill in the art would have been led to the recited temperature and pressures through routine experimentation to have a sputtering rate of 2 nm/min and the recited timing of 60 minutes annealing within the range of 200-800 °C of Batra et al. to achieve the desired deposition and reaction rates.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V. Pham whose telephone number is 571-272-1866. The examiner can normally be reached on M-T (6:30-5:00).

Art Unit: 2823

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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04/15/04


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